

L 05248-67 EWT(1) CW

ACC NR: AT6013757

(N)

SOURCE CODE: UR/2667/65/000/033/0173/0176

AUTHOR: Birman, B. A.

26
B+1

ORG: none*

TITLE: Statistical analysis of the factor for converting from the number of days with precipitation to their recurrence

SOURCE: *Moscow. Nauchno-issledovatel'skiy Institut aeroklimatologii. Trudy, no. 33, 1965. Voprosy klimatologii (Problems in climatology), 173-176

TOPIC TAGS: atmospheric precipitation, diurnal variation, statistic analysis

ABSTRACT: The periods of observational years during which it is possible to calculate the factor for converting from the number of days with precipitation to their recurrence are examined. The investigation was carried out on the basis of analyzing the result of processing meteorological observations of precipitation for two stations: Valentin (Soviet Union) and Sakai (Japan). Periods of 5, 10, and 15 yr were selected at random between 1936 and 1962. The conversion factor was calculated by the formula

$$K = \frac{S}{nm}$$

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where S is the number of cases with precipitation, n is the number of days with precipitation, m is the number of observational periods. The results of the calculation were smoothed out for three successive months by the moving average method. It was found that when calculating the factor for converting from the number of days with precipitation to their frequency, a 10-yr period of averaging is sufficient. The observational years should be selected at random in order to obtain a more accurate sampling means of the conversion factor. A 25-yr period of observation is sufficient for calculating the average number of days with precipitation. Orig. art. has: 8 formulas and 1 figure.

SUB CODE: 04, 12/ SUBM DATE: none/ ORIG REF: 005

Cord 2/2 *gh*

"APPROVED FOR RELEASE: 06/08/2000

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CIA-RDP86-00513R000205320020-7"

L 46328-65 EWT(1)/EWT(m)/T/EWP(t)/EEC(b)-2/EWP(b)/EWA(G) P1-4 IJP(G)
GG/JD

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71 L 11879-66 EMT(1)/EMP(a)/EMT(m)/I/EMP(t)/EMP(b) IJP(c) JD/GG/MH
 ACC NR: AT6002242 SOURCE CODE: UR/2564/65/006/000/0116/0121
 44 55 44 55 44 55 44 55
 AUTHOR: Izvekov, V. N.; Sysoyev, L. A.; Onukhovskiy, Ya. A.; Birman, B. I. 57
 ORG: none 21
 TITLE: Preparation of single crystals of refractory compounds from binary or multicomponent systems and effect of temperature conditions of growth on their form and faceting
 SOURCE: AN SSSR, Institut kristallografi. Rost kristallov, v. 6, 1965, 116-121
 TOPIC TAGS: single crystal growing, cadmium sulfide, aluminum oxide, tungstate, titanate, calcium compound, strontium compound, ruby, corundum
 ABSTRACT: The authors studied the growth of cadmium sulfide single crystals from melts of cadmium chloride and iodide and their mixtures, and the growth of single crystals of α -corundum (ruby), rutile, strontium titanate and calcium tungstate from fluorides. CdS single crystals with a wurtzite lattice were obtained in the 600 — 380C range from the CdS-CdCl₂-CdI₂ system. The other (oxide) crystals were grown in platinum crucibles in the 1200 — 700C range with slow cooling. An important feature revealed by these experiments is the dependence of the crystal habit of the crystals obtained on the temperature range of the crystallization. This phenomenon is explained by differences in the growth rates of faces having different crystallographical indices, particularly surface roughness. The concept of the influence of

Card 1/2

L 11879-66

ACC NR: AT6002242

surface roughness on the growth forms of crystals is extended to binary and multicomponent systems. Orig. art. has: 6 figures and 1 table.

SUB CODE: 30, 11 / SUBM DATE: none / ORIG REF: 004 / OTH REF: 005

BC
Card 2/2

BIRMAN, B.L., inzh.

Carbon dioxide shielded welding of the internal chamber of a refrigerator. Svar. proizv. 12:35 D '63. (MIRA 18:9)

1. Vasil'kovskiy zavod kholodil'nikov.

1ST AND 2ND COPIES										PROCESS AND PROPERTY INDEX										3RD AND 4TH COPIES									
ca 114 Administration of small doses of bromine to neurotic patients. I. S. Valnberg and B. N. Birman. <i>Byull. Vsesoyuz. Inst. Ekspit. Med.</i> 1935, No. 10, 8-12.--Br therapy has been used by Pavlov's lab. on animals having neurotic disturbances. Large doses of Br were effective in cases of the "strong" types of nervous system (predominance of excitatory processes) while small doses gave good results in the "weak" types (predominance of inhibitory process). This method was applied by the authors to 40 neurasthenic patients who were given Br for a period of 3-6 weeks. Small doses were most effective (2 tablespoonfuls of a 0.1-0.25% soln. daily), especially in eliminating insomnia. Br was ineffective in cases exhibiting no insomnia. In 1/2 of the cases the effects of Br persisted for a few months after its administration was discontinued while in the others the beneficial effects lasted only as long as Br was administered. In most cases the beneficial clinical symptoms were accompanied by corresponding increases in the blood Br. S. A. Carson																													
ASB-5LA METALLURGICAL LITERATURE CLASSIFICATION 8-2																													
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1ST AND 2ND COPIES										3RD AND 4TH COPIES										5TH AND 6TH COPIES									

BIRMAN, B.M.

Role of hypnotic and sleep inhibition in the pathogenesis and in the treatment of neurotic syndromes. Zh. vysshei nerv. deiat., Pavlova 1 no. 1:67-73 Jan-Feb 1951. (GLML 22:5)

BIRMAN, B.N.

Results of clinico-physiological determination of types of the higher nervous function. Zh. vysshei nerv. deiat. 1 no. 6:878-888 Nov-Dec 1951. (OIML 23:3)

1. Leningrad.

BIRMAN, B.N.

Works of I.P. Pavlov in the field of clinical neurology. Nevropat.
psikhiat., Moskva 20 no.6:7-12 Sept-Oct 51. (CIML 21:4)

1. Leningrad.

BIRMAN, B.N.

Development of the Pavlovian theory in clinical neurology. Zh. vysshei
nerv. deiat. 3 no.1:71-76 Jan-Feb 1953. (GLML 24:2)

1. Author deceased.

BIRMAN, Erzsebet

Foreign experiences related to the use of time norms. Epites
szemle 5 no. 4 102-105 '61.

BIRMAN, Erzsébet, tudományos titkar; KRISKA, József, főmesternok

Present achievements and further tasks of the Construction Economy Section, Permanent Committee on Architecture. Építés szemle 7 no.6:174-176 '63.

1. Építésügyi Minisztérium Építésgazdasági és Szervezési Intézet (for Birman).
2. Országos Tervhivatal Építési Főosztálya (for Kriska).

KOSA, Janos (Budapest); HAMMER, Peter; IVANKA, Istvan; MOLNAR,
Mihaly; BIRMANN, Geza (Budapest); ILLES, Janos (Budapest)

Forum of innovators. Ujit lap 15 no. 16:30 25 Ag '63.

DAVIDOVA, E., inzhener; BIRMAN, I., inzhener.

New ceramic products for finishing house exteriors. Stroitel' 2
no.11:32 N '56. (MIRA 10:1)
(Hollow brick) (Tile)

BIRMAN, I.B.

Number of migratory salmon in connection with the length of time spent in fresh water and the origin of the migratory form of life of these fish. (MLRA 6:10)
Zool.shur. 32 no.5:923-931 S-O '53.

1. Amurskoe otdeleniye Tikhookeanskogo instituta rybnogo khozyaystva. (Salmon)

Biblis

BIRMAN, I.B.

BIRMAN, I.B.

Effect of the maximum of solar activity on the conditions of reproduction of *Oncorhynchus gorbusha* (Walbaum) Dokl. AN SSSR 103 no.4:717-719 Ag '55. (MLRA 8:11)

1. Amurskoye otdeleniye Tikhookeanskogo nauchno-issledovatel'skogo instituta rybnogo khozyaystva i okeanografii. Predstavleno akademikom Ye.N.Pavlovskim.

(Salmon)

BIRMAN, I.B.

Local schools of fall-spawning keta in the Amur Basin. Vop. ikht.
no. 7: 158-173 '56. (MIRA 10:3)

1. Amurskoye otdeleniye Tikhookeenskogo nauchno-issledovatel'skogo
instituta morskogo rybnogo khozyaystva i okeanografii.
(Amur River--Salmon)

BIRMAN, I.B.

On the causes of one of the peculiarities in *Oncorhynchus gorbuscha* (Walb.) in the Sea of Japan [with English summary in insert]. Zool.shur.35 no.11:1681-1684 D '56. (MIRA 10:1)

1. Amurskoye otdeleniye Tikhookeanskogo Instituta rybnogo khozyaystva.
(Japan, Sea of--Salmon)

BIRMAN, I.B.

Kuroshio and the population of the Amur fall keta (*Oncorhynchus keta* (Walb.) *infrasp. autumnalis*). Vop. ikht. no. 8: 3-7 '57.
(MLRA 10:8)

1. Amurskoye otdeleniye Tikhookeanskogo nauchno-issledovatel'skogo instituta rybnogo khozyaystva i okeanografii.
(Amur River--Salmon)
(Japan current)

SOV/20-122-1-40/44

AUTHOR: Birman, I. B.

TITLE: On the Distribution and Spawning Migrations of *Oncorhynchus Gorbuscha Walb.* in the North-Western Part of the Pacific (O nasprostraneni i nerestovykh migratsiyakh gorbushi (*Oncorhynchus gorbuscha Walb.*) v severo-zapadnoy chasti Tikhogo okeana)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 1, pp 146-148 (USSR)

ABSTRACT: Since 1955 the author has investigated the problem mentioned in the title. Informations on new salmon types are given only for the purpose of comparison. On figure 1 the data obtained in the years 1955 and 1957 are combined. Based upon these and other observations the author could draw the following conclusions: Before the occurrence of the *Oncorhynchus gorbuscha Walb.* in masses in the coastal waters of the Kurils (Kuril'skaya gryada) and East Kamchatka it could already be found in the east-western direction in the whole investigated region and on either side of it. Towards the coast the fish move widely distributed forming a broad front the length of which corresponds about to that of the mentioned mainland regions (Fig 1). The opinion that there are two completely separated places of

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SOV/20-122-1-40/44

On the Distribution and Spawning Migrations of *Oncorhynchus Gorbusha* Walb.
in the North-western Part of the Pacific

hibernation of this type of salmon is therefore to be rejected (Ref 2). The opinion (Refs 1,2) that the main part of *Oncorhynchus gorbusha* Walb. passes the western part of the Aleutians (Aleutskaya gryada), the Commander Islands (~~Commandorskiye~~) and the eastern shore of Kamchatka south of Cape Kronotskiy does not correspond to the results of this investigation. The migration of *Oncorhynchus gorbusha* Walb. to the South takes only place for a short distance south of the Avachinskiy bay (Refs 3,4). As it is known, the number of *Oncorhynchus gorbusha* Walb. of East Kamchatka is only a fraction of that of West Kamchatka. That part of the Pacific that borders the Kurils (Kuril'skaya gryada) and Hokkaido (Khokkaydo) is far more important for the Kamchatka *Oncorhynchus gorbusha* Walb. as a place of feeding and hibernation than the region south of the Aleutians. The rivers of East Kamchatka are of far greater importance for the reproduction of *Oncorhynchus gorbusha* Walb. than the rivers of West Kamchatka. In this connection the latter are of far greater importance for the Keta and Krasnaya types of salmon. There are 2 figures and 6 ref-

Card 2/4

BIRMAN, I.B.

Distribution of some pelagic fishes in the northern part of the Atlantic Ocean [with summary in English]. Zool. zhur. 37 no.7: 1058-1062 J1 '58. (MIRA 11:8)

1. Kamchatskoye otdeleniye Tikhookeanskogo nauchno-issledovatel'skogo instituta rybnogo khozyaystva i okeanografii, Petropavlovsk-Kamchatskiy.
(Atlantic Ocean--Fishes, Pelagic)

BIRMAN, I.B.

Distribution and spawning migrations of the salmon *Oncorhynchus*
garbushpa Walb. Dokl. AN SSSR 122 no.1:146-148 S '58.

(MIRA 11:10)

1. Predstavlene akademikom Ye.N. Pavlevskim.
(Pacific Ocean--Salmon)

BIRMAN, I.B.

More on the influence of Kuroshio on the dynamics of salmon populations.
Vop. ikht. no.13:16-18 '59. (MIRA 13:3)

1. Kamchatskoye otdeleniye Tikhookeanskogo nauchno-issledovatel'-
skogo instituta morskogo rybnogo khozyaystva i okeanografii (TINRO).
(Pacific Ocean--Salmon) (Kuroshio)

BIRMAN, I.B.

Time of the formation of annual rings on scales of the Pacific salmon and growth rate of the humpback salmon. Dokl.AN SSSR 132 no.5:1187-1190 Je '60. (MIRA 13:6)

1. Kamchatskoye otdeleniye Tikhookeanskogo nauchno-issledovatel'skogo instituta morskogo rybnogo khozyaystva i okeanografii. Predstavleno akademikom Ye. M. Pavlovskim.
(Scales (Fishes)) (Pacific Ocean--Salmon)
(Growth)

BIRMAN, I.B.

Recent data on the marine period of life and sea fisheries of
the Pacific salmon. Trudy sov. Ikht. kom. no.10:151-164 '60.

(MIRA 13:10)

1. Kamchatskoye otdeleniye Tikhookeanskogo nauchno-issledovatel'skogo
instituta morskogo rybnogo khozyaystva i okeanografii (TINRO).
(Pacific Ocean--Salmon)

PAVLOVSKIY, Ye.N., akademik, glav. red.; MOISEYEV, P.A., otv. red.;
SMIRNOV, A.I., zam. otv. red.; BIRMAN, I.B., red.;
KAGANOVSKIY, A.G., red.; KROGIUS, F.V., red.; KROKHIN,
Ye.M., red.; KURENKOV, I.I., red.; LAGUNOV, I.I., red.;
PANIN, K.I., red.; SEMKO, R.S., red.; PARIN, N.V., red.

[Salmon fisheries of the Far East; materials] Lososevoe kho-
ziaistvo Dal'nego Vostoka; materialy. Moskva, Nauka, 1964.
201 p. (MIRA 17:9)

1. Soveshchaniye po voprosam lososevogo khozyaystva Dal'nego
Vostoka. 3d, Petropavlovsk-Kamchatskiy, 1960. 2. Vsesoyuznyy
nauchno-issledovatel'skiy institut morskogo rybnogo khozyay-
stva i okeanografii (for Moiseyev). 3. Kamchatskoye otdele-
niye Tikhookeanskogo nauchno-issledovatel'skogo instituta
rybnogo khozyaystva i okeanografii (for Semko, Birman,
Krokhin, Kurenkov). 4. Kafedra ikhtiologii Moskovskogo uni-
versiteta imeni M.V.Lomonosova (for Smirnov).

BIRMAN, I.B.

Vertical migrations and vertical distribution of salmon in the sea. Dokl. N SSSR 156 no. 2:444-447 My '64. (MIRA 17:7)

1. Kamchatskoye otdeleniye Tikhookeanskogo nauchno-issledovatel'skogo instituta rybnogo khozyaystva i okeanografii. Predstavleno akademikom Ye.N.Pavlovskim.

BIRMAN, I.B.

Some data on the study of local schools and strains of the Kam-
chatka chum salmon. Vop. geog. Kamch. no. 2:82-87 '64
(MIRA 19:1)

BIRMAN, I.M.

Conference on "Utilization of oxygen systems." Prom. energ.
18 no.12:51-52 D '63. (MIRA 17:1)

SOKOLOV, B.M., B.M., prof., doktor ekon.nauk, otv.red.; LEVIN, G.I., kand.
ekon.nauk, red.; VAYNSHTEYN, B.S., red.; BIRMAN, I.Ya., red.

[Problems in the economic effectiveness of capital investments
and of new techniques in building] Voprosy ekonomicheskoi effek-
tivnosti kapital'nykh vlozhenii i novoi tekhniki v stroitel'stve.
Moskva, Gos.isd-vo lit-ry po stroit., arkhitekt. i stroit.materialam,
1959. 252 p. (MIRA 12:5)

1. Akademiya stroitel'stva i arkhitektury. Institut ekonomiki
stroitel'stva.

(Construction industry--Finance)

AGANBEGYAN, Abel Gezevich; BELKIN, Viktor Danilovich; BIRMAN, Igor'
Yakovlevich; KARAPETYAN, Armen Khachaturovich; RIMASHEVSKAYA,
Nataliya Mikhaylovna; TRET'YAKOVA, Al'bin Feoktistovna; KONIKOV,
L.A., red.; PONOMAREVA, A.A., tekhn. red.

[Using mathematics and electronic machines in planning] Primenenie
matematiki i elektronnoi tekhniki v planirovanii. Moskva, Izd-vo
ekon. lit-ry, 1961. 290 p. (MIRA 14:11)
(Russia—Economic policy) (Economics, Mathematical)
(Electronic analog computers)

BIRMAN, Igor' Yakovlevich, kand. ekon. nauk, starshiy nauchnyy sotr.;
KONIKOV, L.A., red.; PONOMAREVA, A.A., tekhn. red.

[The transportation problem in linear programming] Transport-
naia zadacha lineinogo programmirovaniia. Moskva, Ekonomizdat,
1962. 270 p. (MIRA 15:6)

1. Institut ekonomiki Akademii stroitel'stva i arkhitektury SSSR
(for Birman).

(Linear programming) (Transportation)

AGANBEGYAN, A.G.; BELKIN, V.D.; BIRMAN, I.Ya.; KARAPETYAN, A.Kh.;
RIMASHEVSKAYA, N.N.; TRET'YAKOVA, A.F.

Production, distribution and use of national income in
the U.S.S.R. Nauka i zhizn' 29 no.12:26-27 D '62. (MIRA 16:3)
(Income)

CHERNYAVSKIY, Vasilii Osipovich; BIRMAN, I.Ya., red.; BAZLOVA, Ye.M.,
mladshiy red.; PONOMAREVA, A.A., ~~tekhn.~~ red.

[Studies on the problems of economic efficiency] Ocherki po
voprosam ekonomicheskoi effektivnosti. Moskva, Ekonomizdat,
1963. 137 p. (MIRA 16:3)

(Economics)

BIRMAN, I.Ya., red.; MINTS, L.Ye., red.; KONIKOV, L.A., red.;
MISHNAYEVSKAYA, G.V., mlad. red.; PONOMAREVA, A.A.,
tekhn. red.

[Mathematical methods and the problems of production
distribution] Matematicheskie metody i problemy razme-
shcheniia proizvodstva. Moskva, Ekonomizdat, 1963. 347 p.
(MIRA 16:12)

(Industries, Location of)
(Economics, Mathematical)

BIRMAN, Igor' Yakovlevich; GOKHMAN, Viktor Isaakovich; KUTEMAN, Ye.M., retsenzents; LUR'YE, A.L., retsenzents; NESTEROV, Ye.P., retsenzents; MISHNAYEVSKAYA, G.V., red.

[Methodological instructions on the use of linear programming in the determination of optimum networks for transport, supply, and distribution in enterprises] Metodicheskie ukazaniia po opredeleniiu optimal'nykh skhem perevozok, snabzheniia i razmeshcheniia predpriatii s pomoshch'iu lineinogo programmirovaniia. Moskva, Ekonomika, 1964. 117 p.
(MIRA 18:1)

1. Moscow. Nauchno-issledovatel'skiy institut ekonomiki stroitel'stva.

SOV/124-58-11-12018

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 11, p 12 (USSR)

AUTHOR: Birman, K. R.

TITLE: German Academy of Sciences in Berlin Celebrates Leonhard Euler's
250th Birthday (Prazdnovaniye 250-letiya so dnya rozhdeniya
Leonarda Eylera Germanskoy adademiyei nauk v Berline)

PERIODICAL: V sb.: Vopr. istorii yestestvozn. i tekhn. Nr 5. Moscow, AN
SSSR, 1957, pp 217-218

ABSTRACT: An account is given on the gala session of the general assembly of
the German Academy of Sciences and on the International Mathematical
Conference held in commemoration of the 250th birthday of Leonhard
Euler. The themes of the papers read at the conference are enumerated.
N. T. Pashchenko

Card 1/1

BIRMAN, K.R.

Unpublished letter by N.I. Lobachevskii to the Berlin Academy
of Sciences. Ist. mat. issl. no.14:623-625 '61. (MIRA 16:10)

(Lobachevskii, Nikolai Ivanovich, 1793-1856)

BIRMAN, L. G., insh.

Remodeling slag supports of chain grates in TS-35 boilers.
Energetik 8 no. 5:12 My '60. (MIRA 13:8)
(Boilers)

KHOROSHUN, V.K., inzh.; BIRMAN, L.G., inzh.

Continuous supply of phosphate solution into a steam
pipeline system. Energetik 8 no. 12:15 D '60. (MIRA 13:12)
(Steam)

PELESHOK, A.G., inzh.; GANSHIN, L.G., inzh.; BIRMAN, L.G., inzh.

Experience gained in the operation of the leading model of the
BKZ-100 GM boiler. Elek. sta. 34 no.8:4-7 Ag '63. (MIRA 16:11)

SIL'CHENKO, Ye.I.; KARZHEV, V.I.; OROCHKO, D.I.; VAVUL, A.Ya.; ROBO-
ZHEVA, Ye.V.; BIRMAN, M.I.; SHAVOLINA, N.V.; MASINA, M.P.; GON-
CHAROVA, N.V.

In memory of Maria Sergeevna Sudzilovskaia. Trudy VNIGI no.6:
146-158 '54. (MLRA 7:11)
(Sudzilovskaia, Maria Sergeevna, 1904-1953)

BIRMAN, M. N.

Opyt skorostnogo stroitel'stva radiotsentra (Sochinskogo). [Experience of rapid installation of the Sochi radio broadcasting center]. (Vestnik svyazi. Elektrosvaz'. 1947, no. 5, p. 14-15).

DLC: TK4.V45

SO: Soviet Transportation and Communications. A Bibliography, Library of Congress, Reference Department, Washington, 1952, Unclassified.

BIRMAN, M. N.

USSR/Communications - Radio
Station Construction

May 1947

"Experience in High-speed Construction of a
Radio-center," M N Birman, 2 pp

"Vestnik Vsyazi" Vol 7, No 86

Construction details and photos of equipment

1T12

BIRMAN, M. Sh.

PA 163T26

USSR/Mathematics - Approximations

May/Jun 50

"Certain Evaluations for the Method of Steepest Descent," M. Sh. Birman

"Uspekhi Matemat Nauk" Vol V, No 3 (37), pp 152-155

Birman improves certain evaluations as obtained by L. V. Kantorovich for generalized method of steepest descent proposed by him ("Dok Ak Nauk SSSR" Vol LVI, No 3, 1947, p 233; "Uspekhi Matemat Nauk" Vol III, No 6, 1948, p 89). Method consists in construction of sequence (x_n) in which

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USSR/Mathematics - Approximations
(Contd)

May/Jun 50

element x_0 is arbitrary but succeeding elements are determined by a certain iteration formula, which leads to system of linear equations.

163T26

BIRMAN, M.SH.

"A Variant of the Method of Successive Approximations"

Vest Leningrad U, Ser Mat, Fiz i Khim, no. 9, pp 69-75, Sep 1952

An application of a variant of the method of successive approximations to linear functional eqs $Ax-f=0$ in a Hilbert space. Article is a digest of author's diploma work defended 1950 in Leningrad State U imeni Zhdanov, partially representing a generalization of solution of $Ax-f=0$ (Uch Zap Leningrad Pedagog Inst imeni A.I. Gertsena, vol. 64, 1948).

USSR/Mathematics - Operators

11 Jul 53

"Theory of Self-Conjugate Extensions of Positive-Definite Operators," M. Sh. Birman, Leningrad Mining Inst

DAN SSSR, Vol 91, No 2, pp 189-191

States that the principal results in the theory of semi-bounded self-conjugate extensions of a symmetrical positive-definite operator belong to M. G. Kreyn (Matem Sbor. 20(62):3, 43 (1947)). Closely

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connected with this theory are the results of M. I. Vishik (Trudy Moskov Matemat Ob-va [Works of the Moscow Math Soc], 1 (1952)), who has studied the more general problem of the "resolvable" extensions, especially self-conjugate, of an arbitrary operator possessing a bounded inverse. Supplements here some of the results of these two. Presented by Academician V. I. Smirnov 6 May 53.

BIRMAN, M. SH.

11 Sep 53

USSR/Mathematics - Boundary-Value Problems

"Theory of General Boundary-Value Problems for Elliptical Differential Equations," M. Sh. Birman, Leningrad Mining Inst

DAN SSSR, Vol 92, No 2, pp 205-208

Discusses certain problems connected with M. I. Visik's theory of general boundary problems for elliptic differential eqs (M. I. Visik, Trudy Mosk Mat Ob-va (Works of Moscow Math Soc), 1, 1952). Limits the discussion just to the case of the self-adjoint differential operator which utilizes the important results of M.G. 269T72

Kreyn (Matem Spor (Math Symposium), 20(62), 3, 1947) in the investigation. Cites related work of S. G. Nikhlin (Problema Minima Kvadrachnogo Funktsionala, 1952). Presented by Acad V. I. Smirnov 10 Jul 53.

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USSR/ Mathematics

Card : 1/1

Authors : Birman, M. Sh.

Title : On the spectrum of singular boundary problems for elliptical differential equations

Periodical : Dokl. AN SSSR, 97, Ed. 1, 5 - 7, July 1954

Abstract : A theorem is formulated according to which a set of condensation points of an operator's spectrum is not dependent upon the form of the surface and boundary conditions. Proof of the theorem, based on a lemma, is given, and three theorems, related to the spectrum of singular boundary problems for elliptical operators are deduced from the basic equation. 14 USSR references (1934-1954) and one German reference (1934).

Institution : The Leningrad Mining Institute

Presented by : Academician, V. I. Smirnov, April 1954

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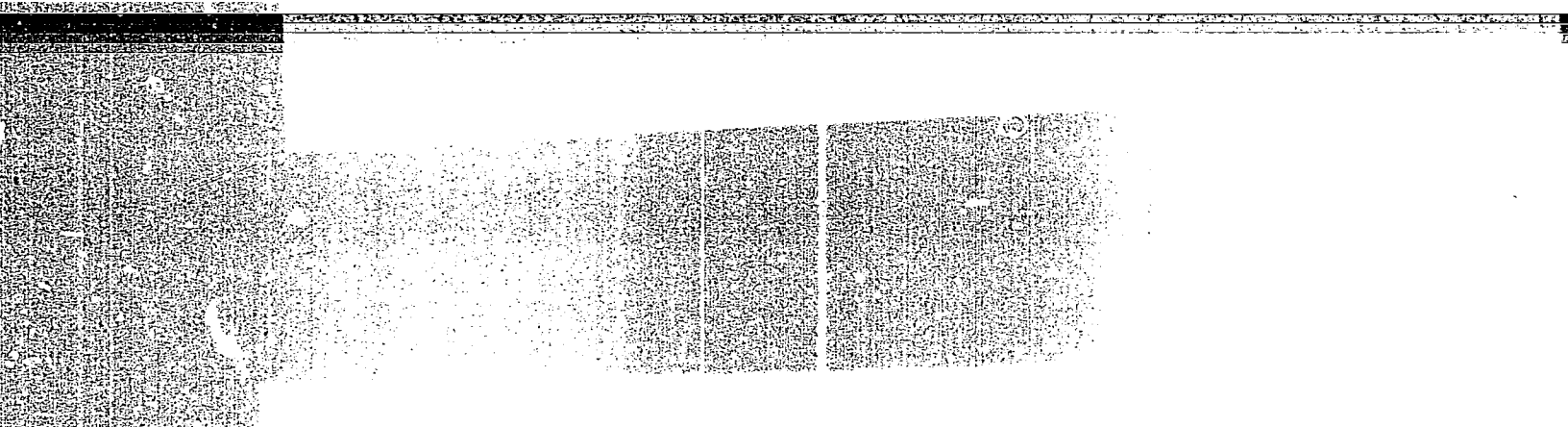
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189-286, MP 14, 473, is that (45) is the correct code.

APPROVED FOR RELEASE: 06/08/2000

CIA-RDP86-00513R000205320020-7"

BIRMAN, M.Sh.

Method of quadratic forms in problems with a small parameter
associated with derivatives of higher order [with summary in
English]. Vest.LGU 12 no.13:9-12 '57. (MIRA 10:11)
(Calculus of operations)

~~BIRMAN, M.S.~~
BIRMAN, M.S.

Properties of elliptic differential operators with a maximum determination domain [with summary in English]. Vest. LGU no.19:177-183 '57.
(Operators (Mathematics)) (MIRA 11:1)

SOV/42-13-5-11/15

AUTHORS: Bakel'man, I.Ya, Birman, M.Sh., and
Ladyzhenskaya, O.A.

TITLE: Solomon Grigor'yevich Mikhlin (on the Occasion of his 50th
Birthday) (Solomon Grigor'yevich Mikhlin (K pyatidesyatiletuyu
so dnya rozhdeniya))

PERIODICAL: Uspekhi matematicheskikh nauk, 1958, Vol 13, Nr 5, pp 215-222 (USSR)

ABSTRACT: This is a short biography and a summary of the scientific
activity of S.G. Mikhlin with a list of his publications
(1932-1957) containing 78 papers. There is a photo of Mikhlin.

Card 1/1

SMIRNOV, Vladimir Ivanovich, akademik. Prinimali uchastiye: LADYZHENSKAYA,
O.A., prof.; BIRMAN, M.S.; AKILOV, G.P., red.; POL'SKAYA, R.G.,
tekhn.red.

[Course in higher mathematics] Kurs vysshei matematiki. Moskva,
Gos.izd-vo fiziko-matem.lit-ry. Vol.5. 1959. 655 p. (MIRA 12:10)

(Mathematics)

16(1)

AUTHOR:

Birman, M. Sh.

SOV/20-125-3-1/63

TITLE:

Perturbations of Quadratic Forms and the Spectrum of Singular Boundary Value Problems (Vozmushcheniya kvadratichnykh form i spektr singulyarnykh granichnykh zadach)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 3, pp 471-474 (USSR)

ABSTRACT:

Lemma : Let $A[u, u]$, $C[u, u]$ be closed positive-definite quadratic forms in the Hilbert space H with domains $D[A]$, $D[C]$; $\tilde{A}$ and $\tilde{C}$ are assumed to be the generated self-adjoint operators. Let be $D[A] = D[C]$; the form $B[u, u] = C[u, u] - A[u, u]$ is assumed to possess on $D[A]$ a majoring form $\tilde{A}^{-1} F$, $B_1[u, u] \geq |B[u, u]|$, where the compactness of the set $\tilde{A}^{-1} F$ in the B_1 -metric is assumed to follow from the boundedness of a set F in H . Then $\tilde{A}^{-1} - \tilde{C}^{-1}$ is completely continuous from H in $D[A]$ so that the condensation spectra of $\tilde{A}$ and $\tilde{C}$ are identical.

Several applications of the lemma are given; e.g.: the condensation spectra of the Schrödinger operators $-\Delta u + p_k(x)u$, $p_k(x) \geq 1$, $k = 1, 2$ are identical, if $|p_2(x) - p_1(x)| p_1^{-1}(x) \rightarrow 0$

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Perturbations of Quadratic Forms and the Spectrum
of Singular Boundary Value Problems

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holds for $|x| \rightarrow \infty$.

The author gives two further lemmata and as their application the following theorems : 1. In order that the negative spectrum of the Schrödinger operator M , $Mu = -h\Delta u - p(x)u$, $p(x) > 0$, $h > 0$ in $L_2(E_m)$ be discrete (or continuous) for all $h > 0$, it is necessary and sufficient that each set of functions which is bounded in the metric of the integral

$$\int_{E_m} (|\nabla u|^2 + |u|^2) dx \quad (\text{or} \quad \int_{E_m} |\nabla u|^2 dx)$$

is compact in the metric of the integral

$$\int_{E_m} p|u|^2 dx$$

2. In order that the continuous spectrum of the operator l , $ly = (-1)^n \Delta y - p(x)y$, $p(x) > 0$ be identical for all $h > 0$ with $[0, \infty)$, it is necessary and sufficient that

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Perturbations of Quadratic Forms and the Spectrum
of Singular Boundary Value Problems

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$\int_x^{x+B} p(x) dx \rightarrow 0$ holds for $x \rightarrow \infty$. In order that the negative spectrum of L be continuous for all $h > 0$, it is necessary

and sufficient that $x^{2n-1} \int_x^\infty p(x) dx \rightarrow 0$ holds for $x \rightarrow \infty$.

The author mentions I.M. Glazman, B.S. Pavlov. There are 11 references, 8 of which are Soviet, and 3 American.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet imeni A.A. Zhdanova
(Leningrad State University imeni A.A. Zhdanov)
PRESENTED: December 15, 1958, by V.I. Smirnov, Academician
SUBMITTED: December 10, 1958

Card 3/3

~~16(1)~~ 16.3500, 14.4600
AUTHOR: Birman, M.Sh.

66716

SOV/20-129-2-1/66

TITLE: On the Spectrum of the Schrödinger and Dirac Operators

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 2, pp 239-241 (USSR)

ABSTRACT: Consider $Mu = -\Delta u + p(x)u$ with continuous $p(x)$ in E_m . $p(x)$ is called a K-potential, if $\int |p(x)| dx$, extended over an arbitrary hypercube of fixed volume, tends to zero under removal of the cube from the origin. If, however, it is $p(x) = p(|x|)$ and $r \int_r^\infty |p(r)| dr \rightarrow 0$ for $r \rightarrow \infty$, then $p(x)$ is called an R-potential.

Theorem 1: If the K-potential $p(x)$ is bounded, then the condensation spectrum of M is identical with $[0, \infty)$. If $p(x) \leq 0$ for large $|x|$ and if the negative spectrum of the operator $M_\alpha u = -\Delta u + \alpha p(x)u$ is discrete for $\alpha > 0$, then $p(x)$ is a K-potential.

Theorem 2: If $p(x) \leq 0$ for large $|x|$ and

$$(1) \sup_R R^{2-m} \int_{|x| \leq R} |p(x)| dx = \infty,$$

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On the Spectrum of the Schrödinger and Dirac Operators SOV/20-129-2-1/66 66716

then the negative spectrum of M is infinite. If $p(x) = -p(|x|) \leq 0$, $m \geq 3$ and if the negative spectrum of M_α is infinite for all $\alpha > 0$, then (1) is satisfied. If $p(x) = -p(|x|) \leq 0$, $m \geq 3$, then it is necessary and sufficient for the finiteness of the negative spectrum of M_α for all $\alpha > 0$ that $p(x)$ is an R-potential.

The unidimensional Schrödinger operator $ly = -y'' + p(x)y$ with everywhere periodic $p(x)$ is assumed to be disturbed by the additional nonperiodic potential $q(x)$. Theorem 3: In order that the spectrum of $ly + \alpha q(x)y$, $q(x) \leq 0$ lying on the left of the lower bound of l be finite for all $\alpha > 0$, it is necessary and sufficient that $q(x)$ and $q(-x)$ are R-potentials for $x > 0$ and $x < 0$ respectively. Two further theorems deal with the Dirac operator in $L_2(E_3)$. The author mentions I.M. Glazman.

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On the Spectrum of the Schrödinger and Dirac Operators 66716
There are 5 references, 3 of which are Soviet, and 2 American. SOV/20-129-2-1/66

ASSOCIATION: Leningradskiy gosudarstvennyy universitet imeni A.A.Zhdanova
(Leningrad State University imeni A.A.Zhdanov)

PRESENTED: July 1, 1959, by V.I.Smirnov, Academician

SUBMITTED: June 23, 1959

Card 3/3

16.3500 16.4600

69760

AUTHOR: Birman, M.Sh.

S/043/60/000/02/11/011

TITLE: Concerning the Discrete Part of the Spectrum of Schrödinger and Dirac Operators

PERIODICAL: Vestnik Leningradskogo universiteta, Seriya matematiki, mekhaniki i astronomii, 1960, No.2, pp.167-168

TEXT: The present paper is a completion of (Ref.1,2). In the E_m the author considers the operator $M_\alpha u = -\Delta u - \alpha p(x)u$; $p(x) \geq 0$, $\alpha > 0$. Three theorems contain conditions that the negative spectrum of M_α is finite. Two further theorems are devoted to the Dirac operator

$$S\varphi = i\alpha_1 \frac{\partial \varphi}{\partial x_1} - i\alpha_2 \frac{\partial \varphi}{\partial x_2} - i\alpha_3 \frac{\partial \varphi}{\partial x_3} + \alpha_4 \varphi + q(x)\varphi$$

with a scalar bounded product $q(x)$. Example:

Theorem 2: If for $m \geq 3$ it holds $|x|^2 p(x) \in K$ and $|x|p(x) \in R$, then the negative spectrum of M_α is finite for all $\alpha > 0$.

Here it holds $f(x) \in K$ if $\int_{|y-x| \leq 1} f(y) dy \rightarrow 0$ for $|x| \rightarrow \infty$ and $f(x) \in R$ if

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of Schrödinger and Dirac Operators

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S/043/60/000/02411/011

$\int_{|y-x| \leq a} f(y) |x-y|^{1-m} dy \rightarrow 0$ uniformly with respect to x for $a \rightarrow 0$.

The author mentions P.N.Knyazev. There are 3 Soviet references.

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BIRMAN, M.Sh.

Discrete part of the spectra of Schrodinger and Dirac operators. Vest.LGU 15 no.7:167-168 '60. (MIRA 13:4)
(Operators(Mathematics))

BLICHAJ, M.S.H.; PAVLOV, E.S.

Complete continuity of certain imbedding operators. Vest. LGU
16 no. 1:61-74 '61. (IAA 14:2)
(Functional analysis) (Operators (Mathematics))

BIRMAN, M.Sh. (Leningrad)

Spectra of singular boundary value problems. Mat. sbor.
55 no.1:125-174 3 '61. (MIRA 14:10)
(Boundary value problems--Spectra)

16.4600 16.3500 16.3400
 AUTHOR: Birman, M.Sh. (Leningrad)

29021
 S/039/61/055/002/001/002
 C111/C222

TITLE: On the spectrum of singular boundary value problems

PERIODICAL: Matematicheskiy sbornik, v.55, no. 2, 1961, 125 - 174

TEXT: The spectra of singular boundary value problems are investigated on the base of the theory of perturbation. Semibounded problems are chiefly treated, where the possible variations of the spectrum can be described with the aid of the perturbations of corresponding quadratic forms. § 1 treats the qualitative theory of perturbations of the spectrum of self-adjoint operators in the abstract separable Hilbert space H . The theorem due to Weyl on the spectrum of condensation is transferred to the case of semibounded perturbations. The connection between the behavior of discrete parts of the spectra of several eigenvalue problems (obtained by a differential introduction of a parameter in the differential equation) is investigated. Finally, a theorem on non-semibounded operators is proved. The interval (α, β) is called a gap of the selfadjoint operator S if (α, β) contains no points of the spectrum of S . Let $(\alpha, \beta) \equiv (-1, 1)$.

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Theorem 1.5 : Let S be a selfadjoint operator with the gap $(-1, 1)$, T be a bounded selfadjoint operator, let $S + T$ have only a discrete spectrum in $(-1, 1)$ which does not have the point $\lambda = 1$ as an accumulation point. Let B be a bounded selfadjoint operator, let $B \geq 0$ and $B^{1/2} S^{-1}$ be completely continuous in H . Then the selfadjoint operator $F = B + T + B$ in $(-1, 1)$ can have only a discrete spectrum for which $\lambda = 1$ is no accumulation point. § 2 contains marks for the compactness of certain families of functions in infinite regions. The marks are assertions on imbeddings. Let R_m be an m -dimensional Euclidean space, $S_a(x)$ be a sphere in R_m with the center x and the radius a ; let the weight $p(x)$ belong to the class K if for an $a > 0$ and $|x| \rightarrow \infty$ it holds : $\int_{S_a(x)} |p(y)| dy \rightarrow 0$; let $p(x)$ belong to the class $K(\omega)$ if for an $a > 0$ the integral $\int_0^{g+a} |p(r, \omega)| dr \rightarrow 0$ uniformly in ω for $g \rightarrow \infty$. With these notations there hold e.g. the theorems :

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Theorem 2.1 : In order that the imbedding operator of $W_2^{(1)}(R_1)$ is completely continuous in $L_2(R_1; p)$ it is necessary and sufficient if $p(x) \in K$.

Theorem 2.3 : If $p(x) \in K(\omega)$ then the imbedding operator of $W_2^{(1)}(R_m)$ is completely continuous in $L_2(R_m; p)$.

The §§ 3 and 4 are devoted to the application of the results of § 1 and § 2 to the investigation of the spectrum of singular boundary value problems. Let e.g. the operator

$$lu = \sum_{k=1}^n (-1)^k [p_k(x)u^{(k)}]^{(k)} \quad (3.1)$$

be considered on $(0, \infty)$. Then there holds the theorem :

Theorem 3.1 : If in the differential expression (3.1) $0 < c_0 \leq p_n(x) \leq c_1 < +\infty$ and $p_0(x), \dots, p_{n-1}(x), p_n(x) - 1$ belong to the class K then for arbitrary selfadjoint boundary conditions, at the point 0, the operator l

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is semibounded from below in the $L_2(0, \infty)$, and its continuous spectrum is identical with $[0, \infty)$.

Theorem 3.2 : In (3.1) let $p_k(x) \geq 0$ ($k = 1, \dots, n-1$), $p_n(x) > 0$, $p_0(x) \geq 1$; to the $p_k(x)$ let be added such perturbations $q_k(x)$ that $|q_k| p_k^{-1} \rightarrow 0$ for $x \rightarrow \infty$ ($k = 0, 1, \dots, n$) and $p_n(x) + q_n(x) > 0$. Then the continuous spectra of the operator l and the perturbed operator $\hat{l}$ are identical with the coefficients $\hat{p}_k = p_k + q_k$ (for arbitrary selfadjoint boundary conditions in zero). Then the author gives analogies to the theorems 3.1 and 3.2 for the multi-dimensional case; especially it is shown that if the potential $p(x)$ in the Schrödinger operator

$$\mathcal{M}u = -\Delta u + p(x)u \quad (3.8)$$

belongs to the class $K(\omega)$ then the operator $\mathcal{M}$ is semibounded from below

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and its spectrum of condensation reads $s(\mathcal{M}) = [0, \infty)$. Furthermore: If the operators $\mathcal{M}u$ and $\mathcal{M}'u$ have the form (3.8) with the potentials $p(x) = p_1(x) + ip_2(x)$ and $p_1(x)$, where $p_1(x) \geq 1$ and either $p_2(x) \in K(\omega)$ or $|p_2(x)/p_1^{-1}(x)| \rightarrow 0$ for $|x| \rightarrow \infty$ then it holds $s(\mathcal{M}) = s(\mathcal{M}')$.

§ 4 contains especially the investigation of the discrete part of the spectrum. The author gives marks for the fact that the negative spectrum is discrete where in essential the operators (3.8) and

$$(-1)^n u(2n) + p(x)u$$

(3.13)

are considered.

Let $p_+(x) = \max \{p(x); 0\}$, $p_-(x) = -[p(x) - p_+(x)]$. Let $p(x)$ be called almost radical if $p(x) \geq 0$ and $\max_{|x|=r} p(x) \leq c \min_{|x|=r} p(x)$. Let the function $p(x) = p(r, \omega)$ belong to the class $\bar{Q}$ if $\ln \int_0^\infty r |p(r, \omega)| dr \rightarrow 0$

holds uniformly with respect to ω for $\xi \rightarrow \infty$. With these relations there

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hold e.g. the following theorems :

Theorem 4.3 : If for a sufficiently large $a > 0$ it holds

$$\max_{t \geq a} t^{2n-1} \int_t^{\infty} p_-(t) dt \leq 2^{-2n} (2n-1)^{-1} [(2n-1)!!]^2 \quad (4.1)$$

then the negative spectrum of the operator (3.13) is finite in $L_2(0, \infty)$.
Theorem 4.10: In order that for $m \leq 3$ the operator (3.8) with the potential

$$p(x) = - (m-2)^2 4^{-1} |x|^{-2} - \alpha \varphi(x) \quad (4.17)$$

for all $\alpha > 0$ has a finite negative spectrum it is sufficient and for an almost radial nonnegative function $\varphi(x)$ also necessary that $\varphi_+(x)$ belongs to the class $\bar{Q}$.

In § 5 the author describes the treatment of a non-semibounded problem at the example of the Dirac operator which is written as a differential operator S in $L_2(R_3)$ as follows :

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$$S\varphi = [\alpha_1 p_1 + \alpha_2 p_2 + \alpha_3 p_3 + \alpha_4] \varphi + q(x)\varphi. \quad (5.1)$$

Here $p_k = -i \frac{\partial}{\partial x_k}$, $\varphi(x)$ is a bispinor, α_k are Dirac number matrices, $\alpha_j \alpha_k + \alpha_k \alpha_j = 2\delta_j^k$, $q(x)$ is a scalar potential bounded for large $|x|$.

Theorem 5.1 : If $q^2(x) \in K$ then the spectrum of condensation of (5.1) fills up the whole axis with the exception of the interval $(-1, 1)$.

Theorem 5.2 : The total multiplicity of the spectrum of (5.1) in $(-1 + \eta, 1 - \eta)$, $0 \leq \eta < 1$ is not greater than the quadruple total multiplicity of the spectrum of (3.8) in $(-\infty, -2\eta(2 - \eta))$ for $p(x) = -2(q^2 + 2|q|)$.

Altogether the paper contains 55 theorems and lemmas. Most of the results are already announced by the author in earlier papers (Ref. 32 : Vozmushcheniya kvadraticnykh form i spektr singular-
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On the spectrum of singular ...

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yarnykh granichnykh zadach [perturbations of quadratic forms and the spectrum of singular boundary value problems], DAN SSSR, v. 125, no.3 (1959), 471 - 474; Ref. 33 : 0 spektre operatorov Shredingera i Diraka [On the spectrum of operators of Schrödinger and Dirac], DAN SSSR v.129, no. 2 (1959), 239-241; Ref. 34 : 0 diskretnoy chasti spektra operatorov Shredingera i Diraka [On the discrete part of the operators of Schrödinger and Dirac], Vestnik LGU, no. 7 (1960), 167-168)). The author mentions A.M. Molchanov, A.Ya. Povzner, I.M. Gel'fand, I.M. Glazman, M.G. Kreyn, S.G. Mikhlin, M.I. Vishik, P.N. Knyazev, S.L. Sobolev, B.S. Pavlov, I.S. Kats and V.A. Fok. There are 27 Soviet-bloc and 7 non-Soviet-bloc references. The references to the four English-language publications read as follows : V. Bargmann, On the number of bound states in a central field of force, Proc.Nat.Acad.USA, 38, no. 11 (1952), 961-966; F.Wolf, On the essential spectrum of partial differential boundary problems, Comm. pure and appl. Math., 12, no. 2 (1959), 211-228; K. Friedrichs, Criteria for the discrete character of the spectra of ordinary differential operators,

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On the spectrum of singular ...

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C111/C222

studies and essays presented to R. Courant, New York, 1948, 145 - 160;
E. Hille, Non-oscillation theorems, Frans. Amer. Math. Soc., 64, no. 2,
(1948), 234 - 252 .

SUBMITTED: December 2, 1959

Card 9/9

S/140/62/000/005/001/004
D237/D308

AUTHORS: Birman, M.Sh., and Skvortsov, G.Ye.

TITLE: On the quadratic summability of principal derivatives of the solution of the Dirichlet problem in the region with a piece-wise continuous boundary

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, no. 5, 1962, 12 - 21

TEXT: The Dirichlet problem is considered for the elliptical operator of the 2nd order

$$Lu = \frac{\partial}{\partial x_j} (a_{ij} \frac{\partial u}{\partial x_j}) + a_i \frac{\partial u}{\partial x_i} + au \quad (1)$$

in the region Ω whose boundary Γ consists of a finite number of triply differentiable arcs meeting each other at angles $\neq 0^\circ$. The following classes of functions defined in Ω are considered: $C_k(\overline{\Omega})$ = the manifold of functions continuously differentiable k-times in the closed region $\overline{\Omega}$. $C_{k,0}(\overline{\Omega})$ - the manifold of functions from C_k

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$(\bar{\Omega})$ which become zero on Γ , $L_2(\Omega)$ = the functional space, quadratically summable on Ω . $W_2^{(k)}(\Omega)$, $k \geq 1$ - the functional manifold, possessing all quadratically summable on Ω generalized derivatives, up to the k^{th} order inclusive. $W_{2,0}^{(k)}(\Omega)$ - the manifold of functions from $W_2^{(k)}(\Omega)$, which become zero on Γ . Four lemmas lead to the theorem. Let Ω be a bounded plane region with a piece-wise triply continuously differentiable boundary and L - an elliptical operator in Ω , of the type (1). If $D(L, \Omega)$ is a manifold of weak solutions of the boundary problem

$$Lu = f(x), \quad u|_{\Gamma} = 0$$

when $f(x)$ assumes all $L_2(\Omega)$. Then 1) the class $W_{2,0}^{(2)}(\Omega)$ coincides with the closure of $C_{3,0}(\bar{\Omega})$ in $W_2^{(2)}(\Omega)$, and the apriori estimate

$$\|u\|_{W_2^{(2)}(\Omega)} \leq c \|Lu\|_{L_2(\Omega)} \quad (5)$$

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On the quadratic summability of ... S/140/62/000/005/001/004
D237/D308

is fulfilled on the functions of $W_{2,0}^{(2)}(\Omega)$. $2) \dim \tilde{D}(L, \Omega) \pmod{W_{2,0}^{(2)}(\Omega)}$ - number of angular points of Γ , with the angles $> \pi$.

In the case of n-dimensional boundary problems the authors deduce that for $n > 2$ the $\dim \tilde{D}(L, \Omega)$ or its defect number becomes infinite. ✓

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova (Leningrad State University, im. A.A. Zhdanov)

SUBMITTED: October 2, 1961

Card 3/3

BIRMAN, M.Sh.

Perturbations of the continuous spectrum of a singular elliptic
operator due to changes in the boundary or in boundary conditions.
Vest. LGU 17 no.1:22-55 '62. (MIRA 15:1)
(Boundary value problems) (Operators (Mathematics))

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35511

S/020/62/143/003/001/029
B112/B102

AUTHOR: Birman, M. Sh.

TITLE: Conditions of the existence of wave operators

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 3, 1962, 506-509

TEXT: The author considers two selfadjoint operators A_1 and A_2 in a Hilbert space $\mathcal{H}$. $\mathcal{H}_k$ are the subspaces of $\mathcal{H}$, in which A_k operate absolutely continuously. P_k are the corresponding projection operators. It has been proved by other authors that there are limiting operators

$$U_{\pm}(A_2, A_1) = \lim_{t \rightarrow \pm\infty} \exp(iA_2 t) \exp(-iA_1 t) P_1,$$

$$U_{\pm}(A_1, A_2) = \lim_{t \rightarrow \pm\infty} \exp(iA_1 t) \exp(-iA_2 t) P_2,$$

if $(A_2 - A_1)$ is a kernel operator. In this paper, it is demonstrated that

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Conditions of the existence of wave ...

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B112/B102

there are limiting operators

$$U_{\pm}(A_k, A_1) = U_{\pm}(A_k^{-1}, A_1^{-1}) = U_{\pm}(A_k^{-n}, A_1^{-n}) \quad (k \neq 1),$$

if A_1 and A_2 are positively definite, if $(A_2^{-1} - A_1^{-1})$ is completely continuous, and if $(A_2^{-n} - A_1^{-n})$ is a kernel operator. There are 7

references: 2 Soviet and 5 non-Soviet. The English-language references are: M. Rosenblum, *Pacif. J. Math.*, 7, no. 1 (1957), T. Kato, *J. Math. Soc. Japan*, 9, no. 2 (1957), T. Kato, *Proc. Japan Acad.*, 33, no. 5 (1957), S. T. Kuroda, *J. Math. Soc. Japan*, I, 11, no. 3 (1959), II, 12, no. 3 (1960). S. T. Kuroda, *Nuovo Cim.*, 12, no. 5 (1959).

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova
(Leningrad State University imeni A. A. Zhdanov)

PRESENTED: November 13, 1961, by V. I. Smirnov, Academician

SUBMITTED: November 10, 1961

Card 2/2

S/020/62/144/003/001/030
B112/B104

AUTHORS: Birman, M. Sh., and Kreyn, M. G.

TITLE:

Theory of wave and scattering operators

PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 144, no. 3, 1962, 475-478

TEXT: The concept of wave operators is applied to the case of a pair of unitary operators. For unitary operators different from kernel operators, the existence of such wave operators is established. Carrying out a Cayley transformation, the authors obtain wave operators for a pair of selfadjoint operators under an unambiguous condition concerning the kernel difference of the resolvents. Using wave operators, a scattering operator is set up in a well-known manner, which serves to generate an S-matrix (scattering matrix). Certain spectral properties of the scattering matrix are investigated.

ASSOCIATION:

Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova
(Leningrad State University imeni A. A. Zhdanov). Odesskiy
inzhenerno-stroitel'nyy institut (Odessa Construction

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Theory of wave and ...

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B112/B104

Engineering Institute)

PRESENTED: January 5, 1962, by V. I. Smirnov, Academician

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S/020/62/147/005/003/032
B172/B112

AUTHOR: Birman, M. Sh.

TITLE: A test for the existence of wave operators

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 5, 1962, 1008-1009

TEXT: In a Hilbert space self-adjoint operators H_1 and H_2 are given. P_k ($k = 1, 2$) denotes the projector of H_k onto an absolutely continuous subspace $\mathcal{H}_k$ (T. Kato, J. Math. Soc. Japan, v. 9, no. 2, 1957). U_1, U_2 are unitary operators. Conditions are sought for the existence of strong limiting values (wave operators)

$$W_{\pm}(H_k, H_0) = \lim_{t \rightarrow \pm\infty} \exp(iH_0 t) \exp(-iH_k t) P_k,$$

$$W_{\pm}(U_k, U_0) = \lim_{n \rightarrow \pm\infty} U_k^n U_0^{-n} P_0 \quad (k, l = 1, 2)$$

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The concept of the admissible function $\varphi(z)$ is defined. Δ denotes the totality of a finite number of pairwise disjunct intervals (a_k, b_k) , $a_k < b_k \leq a_{k+1}$, $k = 1, \dots, m$, of the real axis where $a_1 = -\infty$ and $b_m = \infty$ are not omitted. The function $\varphi(z)$ is regular in an open set of the complex plane containing Δ and has real values for $\lambda \in \Delta$; besides $\varphi'(\lambda)$ should be > 0 . The intervals $(\tilde{a}_k, \tilde{b}_k)$, $\tilde{a}_k = \varphi(a_k + 0)$, $\tilde{b}_k = \varphi(b_k - 0)$ are assumed to have no common points. If $\tilde{a}_k = -\infty$ ($\tilde{b}_k = \infty$), then the corresponding end point a_k (b_k) is singular. The function $\varphi(z)$ is called admissible for operators H_1, H_2 , if their spectra are contained in the closed shell of Δ and if their eigenvalues are inconsistent with singular end points. Furthermore,

$$\tilde{H}_k = \varphi(H_k), \quad U_k = (H_k - iI)(\tilde{H}_k + iI)^{-1}, \quad \tilde{U}_k = (\tilde{H}_k - iI)(H_k + iI)^{-1},$$

$k = 1, 2$ is written. Hence, the following theorem is valid: If $\varphi(z)$ is admissible for H_1, H_2 and if

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$$(\tilde{H}_2 + iI)^{-1} - (\tilde{H}_1 + iI)^{-1} \in \gamma_1,$$

then the strong limiting values $w_{\pm}(H_k, H_e)$, $w_{\pm}(U_k, U_e)$, exist where

$$w_{\pm}(H_k, H_e) = w_{\pm}(\tilde{H}_k, \tilde{H}_e) - w_{\pm}(\tilde{U}_k, \tilde{U}_e) - w_{\pm}(U_k, U_e).$$

γ_1 is the class of the kernel operators...

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova
(Leningrad State University imeni A. A. Zhdanov)

PRESENTED: June 23, 1962, by V. I. Smirnov, Academician

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Card 3/3

BIRMAN, M.Sh.

Conditions for the existence of wave operators. Izv. AN SSSR.
Ser. mat. 27 no. 4:883-906 J1-Ag '63. (MIRA 16:8)

(Operators (Mathematics))

ACCESSION NR: AP4025106

S/0020/64/155/003/0506/0508

AUTHORS: Birman, M. Sh.; Entina, S. B.

TITLE: A stationary approach into the abstract theory of dispersion

SOURCE: AN SSSR. Doklady*, v. 155, no. 3, 1964, 506-508

TOPIC TAGS: dispersion, dispersion theory, abstract dispersion theory, Hilbert space, self conjugate operator, self adjoint operator, wave operator, finite dimensional perturbation

ABSTRACT: This paper gives a foundation for the so-called stationary sequence of dispersion theory within the framework of the abstract theory of operators. Convenient representations of wave operators and operators of scattering through limiting values of resolvents are given in the assumptions concerning perturbation. One practical and convenient method for computing the S-matrix is also given. A new purely "stationary" proof of the Rosenblum - Kato theorem (M. Rosenblum, Pacif. Journ. Math, v 7, (1957), no. 1; T. Kato, Journ. Math. Soc. Japan, vol. 9 (1957), no. 2; Proc. Japan Acad., vol 33 (1957), no. 5) concerning the existence of wave operators is obtained at the same time. The methodological advantage

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of the method presented herein is the absence of a passage to the limit from finite-dimensional perturbations. This makes it possible to transfer the obtained results to a case of more generalized perturbations, which makes them particularly applicable in a three-dimensional quantum scattering problem. Author also notes that the relation

$$(W_{\pm} f, g) = \int_{-\infty}^{+\infty} |d(E_{\lambda} Q_{\pm}^0 f, g)/d\lambda|_{\lambda=E_{\pm}} d\lambda,$$

is a "correct" notation for the well-known Lippman-Schwinger equation. Orig. art. has: 7 equations.

ASSOCIATION: Leningradskiy gosudarstvennyy* universitet im. A. A. Zhdanova (Leningrad State University)

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BIRMAN, M.Sh.

Local sign of the existence of wave operators. Dokl. AN SSSR
159 no.3:485-488 N '64 (MIRA 18:1)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.
Predstavleno akademikom V.I. Smirnovym.

ACC NR: AP6018490

SOURCE CODE: UR/0020/65/165/006/1223/1226

AUTHOR: Birman, M. Sh.; Solomyak, M. Z.

ORG: Leningrad State University im. A.A. Zhdanov (Leningradskiy gosudarstvennyy universitet)

TITLE: Stieltjes double operator integrals

SOURCE: AN SSSR. Doklady, v. 165, no. 6, 1965, 1223-1226

TOPIC TAGS: Hilbert space, perturbation, mathematics, operator, complex function

ABSTRACT: The article investigates operators in a Hilbert space $\mathcal{H}$, given by integrals of the form: $Q = \int \int \varphi(\lambda, \mu) dF_{\mu} T dE_{\lambda}$.

where F_{μ} , E_{λ} are any two orthogonal unit expansions; T is a bounded operator in $\mathcal{H}$; $\varphi(\lambda, \mu)$ is a complex function. Integrals of form (1) apparently first appeared in the work of Yu. L. Daletskiy and S. G. Kreyn in connection with certain questions of analytic perturbation theory. The purpose of the present article is a systematic study of the properties of operator Q in relationship to the behavior of function $\varphi(\lambda, \mu)$ and the properties of operator T . The authors elucidate the question of the sense in which integrals (1) ought to be understood and establish interrelationships between various possible definitions of the integral. This paper was presented by Academician V. I. Smirnov on 3 May 1965. Orig. art. has: 6 formulas. [JPRS]

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